UNIVERSITY OF TWENTE.

The Influence of Family Context, Prototype Willingness Model and Cannabis Use on Binge Drinking Behavior among Adolescents

Bachelor thesis Psychology

Faculty of Behavioral Science, University of Twente

31th of August, 2011

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Samenvatting

Binge drinking bij jongeren heeft ernstige consequenties. Voorbeelden zijn een hoge bloeddruk, vermindering van hersenen functies en ongepland, risicovol, seksueel gedrag. Daarboven wordt cannabis consumptie toenemend populairder tussen jongeren. Ook deze drug levert zwaarwegend psychische en fysiologische consequenties op. Dit studie probeert om te onderzoeken in hoever familie context en de drie variabelen van de prototype willingness model (d.w.z. prototype favorability, similarity en willigness) een rol spelen in binge drinking. Vervolgens wordt verwacht dat de variabele willingness de relatie tussen alcohol-specific rules (family contex) en binge drinking gemedieerd. Bovendien zal de impact van cannabis consumptie op binge drinking ondezocht worden. Het Twente Model of Binge Drinking wordt hierbij als richtlijn gebruikt. Hiervoor werd een online- of papierensurvey met 210 jongeren (16-20 jaren) uitgevoerd. Resultaten tonen aan dat veel alcohol-specifieke regels, opgesteld door de ouders significant de binge drinking gedrag kunnen verlagen. Verder heeft respect voor de ouders impact op binge drinking. Als beide variabelen samen optreden, is alleen de variabele alcohol-specific rules significant. Mediatie analyse toond aan, dat Willingness om binge drinking te doen geen invloed op de relatie tussen alcohol-specific rules en binge drinking heeft. Dit betekent dat regels over het gebruik van alcohol een goede preventiemethode zijn om jongeren tegen binge drinking te beschermen. Twee variabelen van het prototype willingness model wijzen een relatie met binge drinking op: similarity en willingness. Ook cannabis consumptie was geassocieerd met binge drinking gedrag. Verder onderzoek is nodig om deze resultaten te bevestigen.

Abstract

Binge drinking among adolescents can lead to serious repercussions such as high blood pressure, impairment in brain functions and unplanned risky sexual behavior. Likewise, cannabis is an increasingly popular drug among teenagers, which can have a devastating effect on mind and body. This study examines the relation between family context and the three variables of the Prototype Willingness Model (that is similarity, prototype favorability and willingness) to binge drinking. Furthermore, a mediation effect of willingness to engage in binge drinking on alcohol-specific rules (family context) and binge drinking is expected. Moreover, the impact of cannabis consumption on binge drinking will be examined. The Twente Model of binge drinking is used as a framework. For this purpose, an online- and paper-survey, interviewing 210 adolescents (16-20 years), was conducted. Results show that high parental rules on alcohol consumption can significantly decrease binge drinking. Additionally, parental respect has an impact on binge drinking. However, when both variables are examined together, only alcohol-specific rules seem to be significant. Mediation analysis reveals that willingness to engage in binge drinking does not influence the relation between alcohol-specific rules on binge drinking. This means that rules on the use of alcohol are a good method to prevent adolescents' binge drinking behavior. Furthermore, two variables of the Prototype Willingness Model are connected with binge drinking: prototype similarity and willingness. Cannabis consumption was also associated with binge drinking behavior. Further research is required to confirm these findings.

Contents

1 Introduction

Alcohol, caffeine and nicotine are the most popular drugs nowadays (World Health Organization [WHO], 2011). Numerous health care organizations focus on alcohol, which, from a present-day perspective, would not be legalized again, due to its many harmful effects. According to the WHO, annually 2,5 million people die of the consequences of alcohol consumption (WHO, 2011). In the Netherlands, the average per capita alcohol consumption (liters of pure alcohol) was 9,68 liters in 2008 (WHO, 2008). Therefore, out of 180 countries surveyed , the Netherlands ranks 23, for the greatest consumption of alcohol.

Roughly 10 % of the people of any nation are addicted to alcohol. Addiction crosses all socio-economic classes (Harrison & Gardner, 1999). But what characterizes alcoholism? It is used as "a term of long-standing use and variable meaning, generally taken to refer to chronic continual drinking or periodic consumption of alcohol which is characterized by impaired control over drinking, frequent episodes of intoxication, and preoccupation with alcohol and the use of alcohol despite adverse consequences" (WHO, 2011).

Adolescents and alcohol use

Especially adolescents are in the focus of many alcohol prevention campaigns, for example the "Preventie Alcoholgebruik Scholieren" by the Dutch Youth Department. The absolute necessity of such interventions is indicated by the fact, that in recent years Dutch adolescents are among the heaviest drinkers in Europe (Vega et al., 2002). Furthermore, it is salient that alcohol trends among adolescents changed over the years. From 1993 to 2000, it was noticeable that 21 to 25-year-old females engaged more frequently in binge drinking, consumed more drinks weekly and were drunken more often. Similar patterns could be observed among the 21 to 25-year-old males, as an increase in drunkenness could be detected (Poelen, Scholte, Engels, Boomsma & Willemsen, 2005). A study by Hoofddorp (2001) demonstrates that Dutch teenagers start drinking alcohol at an increasingly younger age. In 1990, 37 % of the female 16 to 17-year-olds were none-drinkers; in 1997 this number had decreased to 16 %. In the same period, the number of their male peer non-drinkers was diminished to 14 %. Not only are adolescents increasingly younger when encountering alcohol the first time, but they also consume it more frequently (Poelen et al., 2005). Summing up, it can be said that the age at which young people start drinking and the frequency of their alcohol consumption have changed noticeably over the years.

Adolescents and cannabis use

Another frequently underestimated popular drug, which is fascinating adolescents more and more, is cannabis. From 1970 to 1991, the cannabis consumption of 18-year-olds has been steadily increasing (Korf, 2002). A study by Knibbe et al. conducted in 2005 revealed that Dutch adolescents think that it is more easy to get alcohol and cannabis than for example French adolescents. Furthermore, it was disclosed that thinking that it is easy to obtain these drugs increases their consumption. (Knibbe et al., 2005). This could be a reason for the increasing number of cannabis consumers. However, the consumer's personality also plays a decisive role. For example, sensation seeking is a well-established predictor to measure adolescents engagement in risky activities. A study by Crawford, Pentz, Chou and Dwyer in 2003 showed, that sensation seeking is a stronger predictor for cannabis use than for the use of other substances such as cigarettes and alcohol. Contrary to the general stereotype of the relaxed cannabis addict who enjoys life, research indicates that regular cannabis consumers have a lower life satisfaction than non-users (Zulling, Valois, Huebner, Oeltmann, & Drane, 2001). In addition, the time of the first cannabis use (<13 years-old) was associated with reduced life satisfaction. The same was observed regarding alcohol consumption (Zulling et al., 2001). Cannabis consumption can lead to fatal psychiatric disorders, such as current conduct disorder, major depression and attention-deficit/hyperactivity disorder (Crowley. Macdonald, Whitmore, & Mikulich, 1998). Irrespective of the psychological consequences, the influence of cannabis on social life and on school achievements should not be underestimated. Cannabis consumers showed significantly poorer family relationships, displayed lower school performance, spent less time on homework, and had more school absenteeism than non-users (Rob, Reynolds, & Finlayson, 1990).

Binge drinking

A new phenomenon called binge drinking has emerged. Binge drinking is usually a group/social activity and aims to get drunk as fast as possible. Chassin, Pitts & Prost (2002) categorized three types of binge drinkers: early-heavy (early onset, high frequency), late moderate (later onset, moderate frequency), and infrequent (early onset, low frequency). The first group is most at risk to suffer from later alcohol dependence. The National Institute of Alcohol Abuse and Alcoholism determined binge drinking as a pattern of drinking that increases a person's blood alcohol concentration (BAC) to 0.08 grams percent or above. This

typically happens when men consume five or more drinks, and when women consume four or more drinks, within about two hours (National Institute of Alcohol Abuse & Alcoholism [NIAAA], n.d.). A study by Hoofddorp (2001) revealed that 75% of all Dutch people aged 12-16 engage in binge drinking.

Consequences of binge drinking

The following data makes it hard to comprehend why so many adolescents engage in binge drinking, because of the enormous physical and psychological consequences. Frequently heavy alcohol abuse results in high blood pressure, increased heart rate, heart rhythm disturbances, and is associated with a higher probability of breast cancer (Miller, Naimi, Brewer & Jones, 2007). Many alcohol-related problems have an impact on the neurological system, such as memory impairment, problems with thinking and concentration and mental disorder. For example, binge drinkers showed a lower ability to reproduce beforehand learned procedures (Brown, Tapert, Grax, & Delis, 2002).

Many experts point out that binge drinking during puberty, which is part of the critical developmental phase of the brain, leads to lifelong impairments in brain function, in such areas as memory, motor skills, and coordination (Hiller-Sturmhöfel & Swartzwelder, 2005). Studies have revealed that regular alcohol consumption promotes health risk behavior such as smoking cigarettes, tolerating drink-driving, and unplanned risky sexual behavior (Thakker, 1998; Zucker, Howard & Boyd, 1994).

Reasons to engage in binge drinking

The question that emerged simultaneously with the phenomenon of binge drinking is why the alcohol consumption pattern changed. Why do adolescents engage in binge drinking? The moment when the average adolescent makes his or her first contact with alcohol is usually marked by the onset of puberty. Puberty is the transition phase between childhood and adulthood, which includes significant physical and psychological changes. It is the time when each adolescent has to define him/herself and has to find his/her place in society (Kroger, 2007). During puberty, alcohol plays a important role when coping with stress (Brick & Pohorecky, 1982) and can serve as an instrument to gain social acceptance (Perry & Murray, 1985). According to the European Schools Project on Alcohol and other Drugs (ESPAD), another part of puberty is the feeling of being unbreakable when it comes to alcohol. Hence, only 17 % of all respondents have reservations concerning negative consequences of regular massive alcohol consumption (Hobell et al., 2004).

An additional reason for teenagers to drink alcohol is that the law for the protection of child and youth in supermarkets and liquor stores is not always strictly adhered. A study conducted by the University of Twente revealed that age controls to buy alcoholic liquors are scarce. A couple of 14-16-year-olds made several attempts to buy alcoholic drinks in supermarkets and liquor stores, which should have only been sold to adults. Out of a total number of 236 attempts 75,8% were successful (Van Hoof, Gosselt & Baas, 2011).

Interventions

Clearly, it is made easy for adolescents to engage in binge drinking. Nonetheless, the trend of binge drinking among adolescents is a critically contemplated issue. To stem this phenomenon, several interventions have been developed, such as the campaign "weerbaarheid, drinken, roken, blowen" invented by STIVORO and Trimbos-institute (2011). The idea behind it is to convey conscious handling of alcohol to the target group, adolescents between 14-18 years old, and to teach them to respect friends who already have chosen to drink responsibly. Furthermore, a prevention study called "Preventie Alcoholgebruik Scholiers (PAS)" has been carried out, which focused on educational work concerning the risks of alcohol consumption for both parents and pupils (Trimbos Institute, 2010).

As said above, binge drinking is an enormous problem. Therefore, it is important to conduct scientific research to be able to assess risk factors and develop risk prevention strategies.

Twente Model of Binge Drinking

On the part of behavior research, several models have been developed to clarify the linkage of different components which can be held responsible for the phenomenon of binge drinking. Among others, the Twente Model of Binge Drinking (TMBD) has been developed in 2010 by the University of Twente to measure the possible risk factors of binge drinking among 15-19 year-old Dutch and English adolescents. This model combines cultural context, personality and demographics as ultimate variables, which indirectly influence the dependent variable binge drinking. The ultimate determinants are in advance given characteristics which cannot be influenced by the individual itself. Rather, they affect the distal determinant, which consists of the variable substance use (=cannabis consumption). This has an influence on the proximal determinants referring to the impulsive pathway through the Prototype Willingness Model (P/W Model) (Gibbons, Gerrard, Blanton & Russell, 1998; Gerrard et al., 2002) and

the reflective pathway through the theory of planned behavior (Ajzen, 1991). This, in turn, has a direct impact on the dependent variable binge drinking.
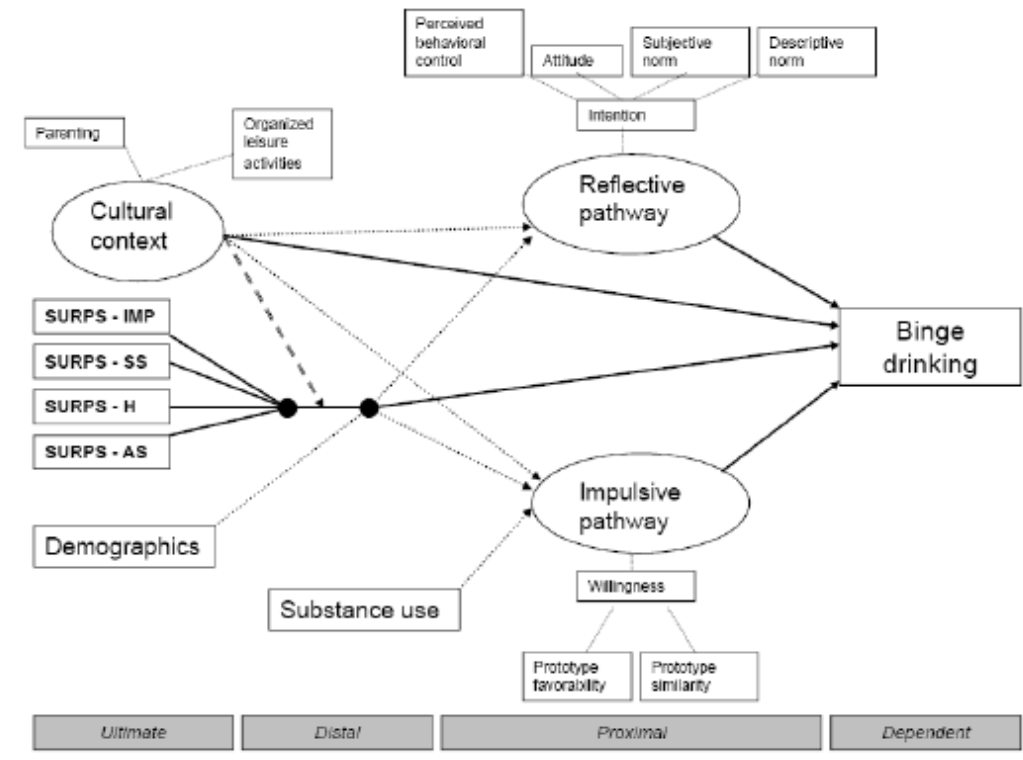

Figure 1- Twente Model of Binge Drinking (TMBD)

As shown in the figure above, the TMBD consists of the following 5 independent variables: personality (SURPS), cultural context, demographics, reflective pathway and impulsive pathway. The dependent variable is binge drinking.

The first variable is the Substance Use Risk Profile Scale (SURPS) , which is divided into four different personality characteristics. These 4 dimensions evaluate variation in personality risk for substance abuse. Sensation seeking is defined as the individual need for sensory stimulation by a new and intensive impression and is associated with binge drinking among adolescents (Zuckermann, 1994). Furthermore, three other personality characteristics were linked with binge drinking: these include impulsiveness, anxiety sensitivity and hopelessness (Woicik, Sterward, Pipl & Concrod, 2009). Impulsiveness measures the tendency to act without thinking and is strongly correlated with the sensation seeking subscale (Conrod, Catellanos & Mackie, 2008). Hopelessness and anxiety sensitivity trigger binge drinking, as alcohol consumption is often seen as an escape attempt. Anxiety sensitivity

describes a person's tendency to fear bodily sensations, for example an increased heart rate. Hopelessness is linked with depressive symptoms and is furthermore related to negative coping strategies with stressful events (Stewart, Sherry, Comeau, Mushquash & Van Wilgenburg, 2010). Demographic information measures the level of education, age and sex.

The cultural context variable implies the components parenting and leisure activities. Parenting is split up into presence alcohol-specific rules, alcohol-specific parental monitoring, quality of alcohol-related communication and respect for the parents. Leisure activities measure to what extent teenagers structure their free time and engage in supervised activities, such as sports (for example football). It is commonly believed that organized leisure activities offer adolescence a more structured life. Thus, they are supposed to be less tempted by binge drinking.

The proximal variables consist of the impulsive and reflective pathway. Both are an aid to identify potential risk factors, which can lead to binge drinking behavior. Proximal determinants are strongly connected with the evaluated behavior and express themselves in experience, feelings and expectations (Brug, van Assema & Lechner, 2007). The impulsive pathway contains the Prototype Willingness Model (P/W Model), which states that deleterious behavior is a reaction to a specific social event (Gibbons, 1995). The P/W Model can be divided into three components: willingness, prototype favorability and similarity. The second information-processing model is the reflective pathway represented by the theory of planned behavior (Ajzen, 1985). In this model, intention is the most important predictor of behavior. It is forecasted by perceived behavior control, which is the perception of the ability to perform a given behavior. Furthermore, the attitude toward the behavior, the subjective norm, and the descriptive norm have impact on the intention to engage in the behavior in question. The subjective norm reflects a person's interpretation of what is approved by others, whereas the descriptive norm reflects what is commonly done in a particular situation.

This study is especially interested in the relation between the cultural context (parenting), the impulsive pathway, cannabis use and binge drinking. Therefore, each of these phenomenon's shall be individually and specifically annotated during the remaining course of this paper.

1. Cultural context

The construct cultural context consists of the two variables parenting and leisure activities. However, this study will only focus on parenting, which from now on shall be called family context.

Family context consists of presence of alcohol-specific rules, presence of alcohol-specific parental monitoring, quality of alcohol-related communication and respect for the parents. Several studies were conducted which indicate that strict alcohol-specific rules and the frequency and quality of alcohol-related communication between the adolescents and the parent prevents heavy binge drinking behavior (Spijkerman, Eijnden & Huiberts, 2008). Furthermore, Ryan, Jorm, and Lubman (2010) showed that parental monitoring delays the child's first contact with alcohol. The most accepted definition of parental monitoring is the parental awareness of the child´s activities and that the parents communicate that they are aware and concerned about the child´s activities (McMahon & Dishion, 1998). Research showed that low monitoring is associated with emerging problem behavior, substance use and risky sexual behavior (Wood, Read, Mitchell & Brand, 2004; Neighbors, Clark, Donovan & Brody, 2000). Rebellious behavior among youths indicates low parental respect, which is likely to end in alcohol abuse. A study revealed that adolescents who negate parental authority are four times more likely to engage in binge drinking (Jackson, 2002). Parents have the chance to exercise great influence on their children and convey the dangers of excessive alcohol consumption to them. Therefore, it is important to find out what kind of parental behavior prevents teenagers from succumbing to binge drinking.

2. Prototype Willingness Model

The Prototype Willingness Model is an often successfully used method to predict future health behavior. It says that health risk behavior is a predictable reaction to a specific social event (Gibbons, 1995). It is composed of three different components: willingness, prototype favorability and similarity. Willingness is a social reaction path, by what no deliberated decision making process takes place. It is the willingness that decides how to behave (Gerrard, Gibbons, Houlihan, Stock & Pomery, 2008). The prototype favorability considers the teenager´s stereotypical image of the typical binge drinker. The more this stereotype corresponds with the teenager's self-image (similarity), the stronger the willingness to engage in binge drinking will become. Summing up, it is evident that much of the adolescent's health risk behavior is not planned, but is influenced by a present situation (Gibbons et al., 1998).

Gerrard, Gibbons, Zhao, Russell & Reis-Bergan (1999) showed that parents have influence on the child's cognition on alcohol, which in turn has an effect on the child´s binge drinking.

Usage of the p/w model in practice showed that both prototypes do not have a strong relation with willingness. Rather, they seem to have a strong connection with the dependent variable binge drinking. Hence, this paper will examine each of the three variables separately.

3. Cannabis consumption

Literature points out that excessive alcohol consumption is positively associated with cannabis consumption, frequency of cigarette smoking and further harmful behavior (Castilla, Barrio, Belza & de la Fuente, 1999). A study by Leatherdale, Hammond & Ahmed (2007) on Canadian adolescents showed, that only few teenagers consumed cannabis without having tried alcohol first. Accordingly, there is a positive coherence between alcohol and cannabis consumption.

This study's aim is to examine the following hypotheses:

1.) The presence of alcohol-specific rules, the presence of parental monitoring, respect for the parents as well as good alcohol-related communication between child and parents will correlate negatively with binge drinking.

2.) All three variables of the P/W Model will bear a positive relation with binge drinking.

3.) Willingness will play a mediating role in the relationship between perceived alcohol-specific rules and binge drinking.

4.) There will be a positive correlation between cannabis use and binge drinking.

2 Methods

1 Participants

The sample consisted of 210 Dutchmen, respectively Dutch-speaking Germans, between 16 and 20 years of age. The participants were attendants of Dutch and German secondary schools and of the University of Twente. The study was implemented with 142 female (68%) and 68 male (32%) participants.

The average age was 18 years. The majority lived with the their parents (67%). The other third lived in shared flats or alone (32%). Half of the respondents were students (51%), the other bigger part were pupils (45%). Most of the participants had a high education level, that is VWO-level or university level (83%).

Table 1- Most important means (M), standard deviations (SD) and percentages regarding the population

	M	SD	%
sex			
male			32%
female			68%
Age	18	1,4	
Housing situation			
Living with parents			67%
Living in communities/alone			32%
Occupation			
student			51%
pupil			45%
other			4%
Education level			
University			42%
VWO			41%
other			17%

2 Instrument

Participation in the study was offered in form of an online-survey, as well as a paper-and-pencil version. Both questionnaires were the same.

2.1 Demographic variables

This variable consisted of five questions. The first two regarded the participants' age and gender. Furthermore, inquiries about housing situation, occupation and highest educational degree were made. Except for the question about age, which was an open-ended question, those answers were gained by using multiple-choice-questions.

2.2 Alcohol consumption

The term „standard units of alcohol" was introduced in order to enable the participants to answer alcohol-related questions. The participants were informed that one glass of wine or one glass of beer equaled one standard unit. Also, a table was shown, that converted different kinds of alcohol into „standard units". This standardized the alcohol use.

Life time prevalence

Life time prevalence was recorded by asking if the participants had ever used alcohol. It was a Yes/No question.

Average consumption during the week and average consumption during the weekend

This question served to gather the total consumption of alcohol. Firstly, participants were asked about the number of days alcohol was consumed during one week. After that, information about the number of standard units per day was acquired. The same questions were issued about the average consumption of alcohol on one weekend. The total consumption per week was calculated by multiplying the days of consumption with the number of standard units. The same procedure was used for the weekend's consumption. These questions were also multiple-choice-questions.

Frequency of binge drinking and heavy binge drinking

In order to judge the participant's engagement in alcohol use, they were asked about how often they had consumed six or more standard units during the last four weeks. Heavy alcohol use was assessed by asking how often they had drunk ten or more standard units. Both questions were multiple-choice-questions (0- never to 10- 9 times or more often).

2.3 Prototype Willingness Model

Impulsive pathway

This component was created by Korte, Pieterse, Posten & Hoof (2011) and consisted of three variables. Each variable was measured on a 5-point Likert scale (1 − strongly disagree to 5 − strongly agree).

Prototype favorability

Prototype favorability consisted of eight questions, that assessed the participant's positive attitude towards severe alcohol users (i.e. What do you think about someone who drinks more than six standard units once a week?). The participants gave information on how cool, brave, interesting, appealing to the other sex, handsome and popular such a person is. Furthermore, the question as to whether those people have an active sexual life and a huge circle of friends was issued. Reliability analysis indicated a high reliability ($\alpha = 0.94$).

Prototype similarity

The participants had to evaluate how much they resemble the typical binge drinking person.

Willingness to engage in binge drinking

Participants inclination to have more than six glasses of alcohol was assessed here. Participants had to imagine to be at a party and being offered a drink from a friend, despite having already consumed more than six standard units. Three possible answers allowed positive, as well as negative responses towards the offered drink (accepting, declining and not-drinking, declining). Participants had to evaluate their potential behavior. Reliability analysis revealed a medium reliability for this variable ($\alpha = 0.63$).

2.4 Family context

This construct consisted of four variables, which were all constructed as a 5-point Likert scale.

Respect for the parents

This variable consisted of six sub questions and was introduced by Bowerman and Bahr (1973). The respectful behavior towards the participants' parents was issued, e.g. „I always try to obey my parents" or „My parents have the most influence on me regarding important

decisions." The 5-point Likert scale ranged from 1 (strongly disagree) to 5 (strongly agree). The reliability analysis indicated a high reliability ($\alpha = 0.80$).

Presence of alcohol-specific-rules

This variable, which was constructed by Van de Vorst, Engels, Meeus, Dekovic and Van Leeuwe (2005), consisted of ten sub questions, that dealt with the rules of alcohol consumption made by the participants' parents. Participants were asked if they were allowed to drink alcohol at home with their parents present or absent, if they were allowed to drink alcohol away from home at parties and if they were allowed to drink alcohol with friends and come home intoxicated. Furthermore, questions were made as to whether or not the participants were allowed to drink alcohol on the weekend and during the week. All questions were put as a 5-point Likert scale (not correct to correct). A high reliability was indicated ($\alpha = 0.94$).

Presence of monitoring

This variable consisted of five sub questions and was created by Van de Vorst et al. (2005), just like the alcohol-specific-rules scale. Substantially, it dealt with how much the participants feel controlled by their parents. For example, the question was raised, as to whether the participants need their parents' consent to drinking alcohol or if they are supposed to reveal how much alcohol they have had during one evening. A 5-point Likert scale was used, ranging from 1 (never) to 5 (always). The reliability analysis indicated a moderate reliability of the scale ($\alpha = 0.70$).

Communication about alcohol

This variable consisted of six sub questions and was introduced by Spijkerman, Van den Eijden and Huiberts (2008). The questions dealt with the communication between parents and children regarding the consumption of alcohol. The mutual interest in alcohol consumption was assessed, as well as whether or not the participants felt taken seriously by their parents. A 5-point Likert scale (strongly disagree to strongly agree) was used. Reliability analysis revealed a high reliability ($\alpha = 0.84$).

Cannabis consumption

The construction consisted of three questions. The first question regarded the life time prevalence. Seven different answers were offered (1- never to 7 – 100 times and more). The

other questions regarded the frequency of cannabis use. As an example, it was asked how often cannabis had been consumed during the last four weeks (range from 1 – not at all to 6 – 9 days or more). The third question dealt with the number of joints that were smoked per day (0 -1 Joints to 6 – 8 Joints or more).

2.2.5. Procedures

The student's attention for the study was attracted by posters and flyers that were distributed and displayed in schools. Also, flyers were dispensed in malls, stores, pubs and cafés in Hengelo, as well as in Enschede and the university of Twente. Furthermore, posters were put up in youth- and sports-centers. These different places of advertising were chosen to make sure that members of different levels of social-economic statuses were addressed. The participants were granted access to the survey by email-contact. The mail address was found on the distributed flyers. The participants were encouraged to make contact with the researchers to receive access data for the online survey. The internet platform SurveyMonkey was used to conduct the survey. After a successful log in, a welcome page appeared. It gave information on the topic of the questionnaire, the duration, and the compensation that was offered after a successful completion. Furthermore, anonymity was assured, as well as approval by the Ethics Committee of the Universtiy of Twente. After reading the welcome page carefully, the participants filled in the informed consent. Participants were given a voucher worth € 10 afterwards. Taking part in the survey took an average of 20 minutes. Participants that used the paper-and-pencil sheet received it during class. The questionnaires were afterwards handed to the teacher in charge.

2.2.6. Data analysis

First of all, the set of data was reassessed. Participants that had filled in only 20 % of the survey or less were excluded. Outliers (e.g. claiming to be 257 years old) were replaced with the mean score of the general results. Moreover reliability was examined for all scales. To obtain answers to the research questions, several correlation analysis were carried out. In addition, regression analyses were introduced to get an overview on the main influences. If the requirements were met, mediation analysis was carried out. SPSS 18. was used to analyze the data.

3 Results

3.1 Drinking habits and cannabis consumption

Out of 210 respondents, 12 had never drunk alcohol. The greatest proportion of the respondents did not drink alcohol during the week (40%), but consumed it at least once a week (30%). If they did, they drank only 1-2 standard units a day (m=1,60). Evidently, participants consumed more alcohol during the weekend. 32% consumed alcohol on one and 28% on two days of the week. Ten participants said that they drank alcohol on all three weekend days (5%). Averagely, five standard units are consumed on one weekend day (M=5,45). 45% said that they had not drunk 6 or more standard units during the last 4 weeks. The second largest part consisted of those who drank 6 or more standard units of alcohol on one occasion (18%). The amount of participants who had drunk two to nine times during the last 4 weeks was 27%. These participants also did not engage in much heavy binge drinking. 69% stated that they had not consumed more than 10 standard units during the last 4 weeks. The second largest proportion were participants who did it once during the last month (12%). The amount of participants who had drunk two to nine times during the last 4 weeks was 19%.

The cannabis scale showed that the population consisted of few cannabis consumers. In sum, 61% had never tried cannabis at all. During the last month, 85% did not used cannabis. Only 8% smoked cannabis on one or two days. The daily consumption was also low. Only 30% consumed cannabis, whereas the average cannabis consumption consisted of a few drags of a joint (M<1).

Table 2- Mean (M), standard deviations (SD) and percentages regarding binge drinking

	M	SD	%
During the week			
Number of days	1,53	1,14	
Amount of standard units alcohol	1,60	2,00	
During weekend			
Number of days	2,37	1,27	
Amount of standard units alcohol	5,45	3,75	
During the last 4 weeks			
6 glasses or more	1,80	2,50	55%
10 glasses or more	1,20	1,86	31,4%
Cannabis consumption			**%= never used cannabis**
Life time prevalence	2,26	1,45	61%
During the last 4 weeks	1,60	1,46	85%
Joints per day	<1	1,10	70%

3.2 Family context

In the analysis, the result for perceived parental rules was moderate, which indicated that the rules concerning alcohol were not thought to be very strict. In general, the participants treated their parents respectfully. Adolescents did not feel monitored by their parents and their communication on alcohol was perceived as good.

Table 3- Descriptive statistics of family context

	M	SD
Presence of alcohol-specific rules (1-not correct to 5-correct)	2,40	1,30
Respect for the parents (1-strongly disagree to 5-strongly agree)	3,53	1,14
Presence of monitoring (1- never to 5- always)	2,30	1,20
Communication about alcohol (1-strongly disagree to 5-strongly agree)	3,70	1,40

3.3 Prototype Willingness Model

Results show that the questions about both prototype favorability and similarity were answered with (strongly) disagree. This means that the participants did not have a positive image of a binge drinker and also did not feel that they bore a resemblance to him/her. The question concerning willingness revealed that the participants would probably consume more than 6 drinks if the situation enforced to do so.

Table 4- Descriptive statistics of Prototype Willingness Model

	M	SD
Prototype Favorability (1-strongly disagree to 5-strongly agree)	1,90	1,00
Similarity (1-not at all to 5-very much)	1,80	0,90
Willingness (1-surely not to 5-surely)	3,60	1,20

3.4 Relationship between family context and binge drinking

A correlation analysis was conducted to examine whether there is a significant relation between each of the four family context variables and binge drinking. Two significant correlations were obtained. Firstly, the family context variable "presence of alcohol-specific rules" and the dependent variable " binge drinking" were negatively correlated (r= —0,28; p<0,001).

This indicates the following: if parents made clearly defined rules referring to alcohol consumption, this positively influenced the adolescent´s conscious handling of alcohol. Also, a negative correlation between "respect for the parents" and "binge drinking" could be detected (r= —0,16; p<0,001). Consequently, adolescents who have strong feelings of respect towards their parents are less likely to binge drink.

A regression analysis showed that the presence of alcohol-specific rules and respect for the parents can explain 9,7 % of the variance in binge drinking. However, only alcohol-specific rules seemed to be significant (β= —0,7; p<0,001). A regression analysis of the variable alcohol-specific rules was conducted. This variable could explain 8,1 % of the variance in binge drinking. Interestingly, apart regression analysis of the variable parental respect showed that it was significant. This variable could explain 2,6 % of the variance in binge drinking.

Table 5- Correlations of the family context and binge drinking

	Binge drinking	
Family context	r	p
Presence of alcohol-specific rules	- 0,28	<0,001
Respect for the parents	- 0,16	0,024
Presence of monitoring	0,02	0,800
Alcohol-related communication	- 0,2	0,802

3.5 Relation between the three variables of the P/W Model and binge drinking

The relationship between the three components of the Prototype Willingness Model and binge drinking was examined. First of all, the significance of the correlations was proved. The component similarity was significant correlated with binge drinking ($r=0,335$, $p<0,001$). The variable favourability was not ($r=0,07$; $p=0,281$). This means that high identification with a positive image of a binge drinker results in binge drinking. As supposed, the correlation between willingness and binge drinking was relative strong ($r=0,295$, $p<0,001$). A strong willingness to engage in binge drinking behavior ends thus in risky alcohol consumption.

Table 6 – Descriptive statistics and correlations of P/W Model

	Binge drinking	
P/W Model	r	p
Prototype Favorability	0,07	0,281
Similarity	0,34	<0,001
Willingness	0,30	<0,001

3.6 Does the cultural context have a significant effect on the risky behavior of young adolescents by influencing the willingness to engage in binge drinking?

To answer this question, a mediation analysis was carried out. In order to conduct the mediation analysis, regression analysis had to indicated that alcohol-specific rules and willingness have relationship with dependent variable binge drinking.
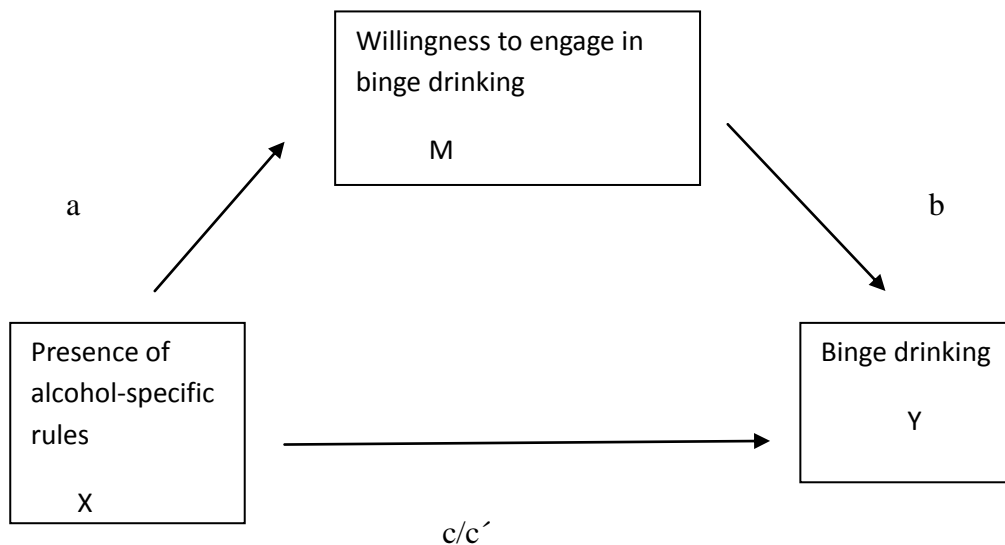
Owing to the analysis, the following three relations were observed: firstly, the pathway c between alcohol-specific rules and binge drinking (t=-4,275, r= ─0,28, p<0,001, β= ─0,075). Secondly, the pathway "a" between alcohol-specific rules and willingness was examined (t= ─3,003, r=0,204, p=0,003, β= ─0,033). Finally, the relationship between willingness and the dependent variable (pathway "b"), when the independent variable is controlled was explored (t=3,749, r=0,373, p<0,001, β=0,407). The amount of mediation was calculated by observing the XY relation with and without the influence of the mediator (c-c`= ─0,075-(-0,062)= ─0,013). The Sobel test (Sobel, 1982) was conducted to reveal more significant results. A partial mediation effect could not be observed (S= ─0,303; p=0,762). The effect of alcohol-specific rules was not mediated by the willingness to engage in binge drinking. Nevertheless, a direct relation between the presence of alcohol-specific rules and binge drinking was detected.

Table 7- Regression

	β	t	Sig.
Regression with dependent variable binge drinking			
Alcohol-specific rules	−0,075 [a] −0,062 [b]	−4,275 [a] 3,550 [b]	<0,001 [ab]
Willingness	0,407	3,749	<0,001

3.7 Does cannabis consumption have a positive relation with binge drinking?

Correlation analysis revealed a positive relationship between cannabis consumption and binge drinking (r=0,23; p=0,001). This means that adolescents who consume cannabis also engage in binge drinking and vice versa. Cannabis consumption could explain 5,1% of the variance in binge drinking.

4 Discussion

The aim of this study was to detect the influence of possible risk factors on binge drinking. This was done in the context of the Twente Model of Binge Drinking. The first research question examined the relation between parenting and the binge drinking behavior of adolescents. It was evident, that alcohol-specific rules and parental respect are significantly linked with binge drinking. Furthermore, the relationship between the Prototype Willingness Model and binge drinking was evaluated. It was assumed that prototype favorability, similarity and willingness are positively related to binge drinking. Results show that this was true only for similarity and willingness. Furthermore, the mediating effect of willingness between perceived alcohol-specific rules and binge drinking was examined. Results showed that willingness did not act as a mediator. As a last resort, the relation between cannabis consumption and binge drinking was examined. A positive correlation was indicated.

4.1 Family context and binge drinking

Perceived parental rules and respect for the parents showed a negative correlation with binge drinking, indicating that strict parental rules in dealing with alcohol and parental respect resulted in lower binge drinking among adolescents. This is in compliance with findings of Van der Vorst et al., (2005) which indicated that high parental rules (concerning alcohol) play an important role in preventing adolescents from starting to drink alcohol heavily and frequently. Simultaneously, adolescents who have parents that are more permissive, that is have no specific rules in regards to alcohol, have a higher chance to engage in binge drinking (Wood, Read, Mitchell & Brand, 2004).

This could be due to the fact that, alongside their parents, teenagers are influenced by their peers. Therefore, parents as well as peers affect an adolescent's substance abuse (Andrews, Tidesley, Hops, & Li, 2002). If the parental home does not lay down rules on alcohol consumption, adolescents adapt to the peer group's standard. However, perceived parental involvement weakens peer influence. Therefore, highly perceived parental rules reduces the relationship between peer influence and alcohol use (Wood et al., 2004). Literature showed that adolescents who respect their parents are more inclined to adapt their parent´s option regarding alcohol usage (Bowerman & Bahr, 1973). Surprisingly, when the influence of both respect for the parents and presence of alcohol-specific rules was examined simultaneously, merely the variable alcohol-specific rules was found to be significant. Only if both variables were analyzed separately from each other, respect for the parents was found to

be significant. From the findings it can be gathered that perceived alcohol-specific rules is a suitable variable to predict binge drinking behavior among adolescents. Even under the influence of other factors, such as respect for the parents, the variable keeps a consistent negative connection with binge drinking. Therefore, it can be deduced that clearly defined rules concerning alcohol serve as a protection against binge drinking and its consequences. Moreover, the participants' average age of 18 has to be taken into account. Surprisingly, even at this age, parents can still influence their children's binge drinking behavior through alcohol-specific rules. This discovery should be considered when preparing further campaigns against binge drinking: even the target group of eighteen-year-olds can be influenced by their parent's rules. Regarding the relationship between alcohol-specific rules and binge drinking together with respect for the parents and binge drinking, it is necessary to illuminate the role of respect more clearly. As respect is insignificant when analyzed with   alcohol-specific rules, it can be assumed that it has a mediating effect on the relation between rules and binge drinking. So far, no literature could be found, which could confirm this assumption. Further research is necessary to deliver new insights.

Clearly, other factors of parenting are also important and should not be ignored. Surprisingly, alcohol-related communication and perceived parental monitoring were not related to binge drinking. The perceived monitoring scale showed the lowest reliability of all four parenting scales. Therefore, it should be revised to obtain higher significance. Regarding alcohol-specific communication, a negative correlation with binge drinking was expected. It is difficult to imagine that parent-child communication about alcohol should not influence binge drinking behavior. Besides, research has shown that alongside alcohol-specific rules, communication related to alcohol can also stem binge drinking (Van der Vorst et al., 2006). These findings could be due to some limitations of this study, which will be discussed later. Furthermore, it would be exciting to examine if female and male adolescents react differently to varying parenting styles. For example, a study by Fighery, Blum, Spencery, & Viscariello (2010) revealed that males with highly authoritarian mothers are at greater risk of alcohol use. Therefore, it is important to find the right balance of parenting, as parents are the most important attachment figures during a young person's development (Maccoby, 1980). As a result, they have the responsibility to protect their children from the risks of alcohol and prevent an early contact with this substance.

Another aim of this study was to examine whether willingness to engage in binge drinking has a mediating role in the relationship between respect for the parents and binge drinking.

This was not the case. Hence, there is a direct relationship between the presence of alcohol-specific rules and binge drinking. Willingness does not influence this relation.

Summing up, this study revealed that a parent-child relationship with appropriate alcohol-specific rules is most suitable to prevent child from binge drinking.

4.2 The Prototype Willingness Model and binge drinking

The aim of this research was to find out which variable of the P/W Model has a relation with binge drinking. All three were expected to act as good predictors. Findings showed that both similarity and willingness were correlated with binge drinking.

High willingness to engage in binge drinking resulted in high binge drinking behavior. These findings are in consent with the outcomes of other studies, which revealed that behavioral willingness is suitable to predict a variety of risk behaviors (for example unplanned intercourse) among adolescents (Gibbons et al., 1998).

Several studies indicated that the positive perception of people who drink alcohol (prototype favorability) appears to strengthen adolescents' motivations to drink alcohol (Chassin, Presson, Sherman, Corty & Olshausky, 1981). This is backed up by a study of Spijkerman et al. (2007) who showed that positive drinking prototypes are related to the adolescents' self-reported consumption of alcohol. Contrary to those findings, this study revealed that prototype favorability was not related to binge drinking. This could be down to the fact that, generally speaking, participants had a negative image of a binge drinker's prototype. Surprisingly, although favorability was low, a positive relation existed between perceived similarity with the prototype and binge drinking. This study has revealed that the prototype favorability and the perceived similarity with the prototype did not depend on each other. As a result, the Prototype/Willingness model should be adjusted. However, it should be taken into account again that the study at hand has several limitations, which will be explained below.

4.3 Cannabis consumption and binge drinking

A relation between cannabis consumption and binge drinking could be detected. The relationship between cannabis consumption and binge drinking could possibly be explained by means of sensation seeking, which is a personality trait most consistent with drug use and abuse (Segal, Huba, & Singer, 1980). Therefore, people who have a desire for new, stimulating experiences are more at risk to fulfill this need through health risk behavior such as cannabis or alcohol consumption. It would be interesting to determine the influence of

sensation seeking on both cannabis consumption and binge drinking based on the survey's data. Another interesting examination would be to find out which drug enforces the onset of consumption of the other. Are adolescents, who have already consumed cannabis, more likely to engage in binge drinking? A study by Leatherdale and Ahmed (2010) showed that adolescents had already been binge drinking also reported to have used cannabis. This study was carried out in Canada. In the Netherlands, however, the research would have reached a different result, as laws on certain drugs are more liberal and, at the age of 18, teenagers are allowed to consume cannabis legally in coffee shops.

4.4 Limitations

It was evident that the majority of the population had a high level of education. This did not agree with the intention of the researchers, who were interested in a mixture of socioeconomic status (SES) to investigate a broader population. Furthermore, a study by Humensky in 2010 showed that adolescents from low SES are more likely to use substances. At any rate, the amount of heavy binge drinker in the population was low. The same applies to heavy cannabis consumers. With view to the aim of this study, it would have been more advantageous to have a population composed of more binge drinkers and cannabis consumer. Another fact, which could have falsified results was that the percentage of women was high. A study by Wechsler, Dowdall, Davenport and Rimm (1995) showed that fewer women engage in binge drinking. In future studies, it is advisable to include more binge drinker in the sample. All in all, a more balanced population would have been more satisfactory, as the findings then might have been valid for a broader population.

A further aspect, which could have falsified the results, was that roughly one third of the adolescents lived alone. However, they were ask to answer the question as though they were still living with their parents. It is possible that not all of them were not able to complete the task accordingly. This aspect may lead to variance of error and can be a possible explanation as to why some variables of the family context had no effect on binge drinking.

Furthermore, the adolescents' binge drinking behavior was assessed through an objective self-reported questionnaire. Here, also, it is imaginable that they could not always estimate their actual amount of standard units of alcohol, which, in turn, might have lead to false results regarding binge drinking.

The Twente Model of Binge Drinking provides a good framework for additional research in determining risk factors of binge drinking. Referring to the family context, important

conclusions could be reached to prevent adolescents from engaging in binge drinking. Further research is necessary to confirm this findings.

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